ABSTRACT

A composite resistive to high-temperature corrosion and abnormal oxidization, maintains original excellent high-temperature characteristics of Ni alloys over a long period of time, and suitable for applications in a high-temperature such as gas turbines, jet engines, and elements for exhaust-gas systems. A heat-resistant Ni-alloy composite has excellent high-temperature oxidation resistance, including a Ni-alloy substrate that has been subjected to an Al-diffusing treatment. The surface coat has a multi-layer structure including an inner layer composed of an α-Cr phase and an outer layer composed of a β phase (Ni-Al-Cr) and a γ' phase ($Ni_3Al(Cr)$) on the substrate surface. The Al content in the outer layer is at least 20 atomic percent. The α-Cr phase functions as a diffusion-barrier layer. The outer layer retains and secures a high Al content required for self-regeneration of a defective portion of the Al_2O_3 layer damaged in an operating condition.